

## **MT8852B Bluetooth Test Set**

### **Overview**

Anritsu maintain a policy of continuous development and enhancement of instrument software. This software release note defines the latest enhancements and known limitations of software version 5.00.021(N) and details the change history of the software. New software releases when available are freely downloadable from the Anritsu web site at:

<http://www.anritsu.com/en-gb/test-measurement/products/mt8852b.aspx>

For automatic notification of new software releases, send a blank email to:

[bluetooth.support@anritsu.com](mailto:bluetooth.support@anritsu.com)

with a subject heading of "MT8852B software notification request".

### **Change history**

Note: The instrument may display the version with an 'N' suffix as a hardware build configuration indicator.

#### **Changes in 5.00.021(N) relative to 5.00.020(N)**

1. Change to the RS232 EUT control in new MT8852B units due to a obsolete hardware change on RS232 control.

Note: MT8852B testers with control PCB serial numbers "6262222374" or later must use firmware 5.00.021 or later. If an earlier firmware is required, then contact [bluetooth.support@anritsu.com](mailto:bluetooth.support@anritsu.com)

#### **Changes in 5.00.020(N) relative to 5.00.019(N)**

1. Correction to the Symbol Timing Error impairment configuration on the BLE dirty table.

#### **Changes in 5.00.019(N) relative to 5.00.018(N)**

1. Addition of independent Tx power settings for BLR2 and BLR8 in the BLE Sensitivity test.

#### **Changes in 5.00.018(N) relative to 5.00.017(N)**

1. Improvement to 2LE measurement stability.
2. Improvement to 2-wire EUT control.
3. Change to the default CTE packet type selection in the Tx Power Stability test for scripts 1 and 2.

#### **Changes in 5.00.017(N) relative to 5.00.016(N)**

1. Improvement to the BLE packet generator.
2. Robustness improvements to the modulation index measurements on DUTs with multiple BLE standards.
3. Correction to the ESR register status.

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***Changes in 5.00.016(N) relative to 5.00.015(N)***

1. Required for Bluetooth 5.1 option MT8852B-037, Bluetooth Angle of Arrival (AoA) and Angle of Departure (AoD).
2. Correction to dirty transmitter in the BLE packet generator mode, applicable relative to MT8852B testers with firmware versions: 5.00.011(N), 5.00.012(N), 5.00.014(N) and 5.00.015(N). Note the Script mode BLE packet generator was not affected.

***Changes in 5.00.015(N) relative to 5.00.014(N)***

1. Improvement in the system stability across all operating temperatures.

***Changes in 5.00.014(N) relative to 5.00.012(N)***

1. Improvement to 2LE power measurement accuracy.
2. Improvement to 2LE peak to average.

***Changes in 5.00.012(N) relative to 5.00.011(N)***

1. Support for automatic sequencing of measurements on more than one BLE packet type (BLE, 2LE, BLR2, BLR8).
2. Correction to the instability when connecting with EUT via USB.

***Changes in 5.00.011(N) relative to 5.00.009(N)***

1. Addition of EDR guard time and EDR synchronization sequence and trailer test cases as defined in TCRL2017-1.
2. Improvement to BLE test case measurement speed.

Note: The additional EDR test cases are enabled on scripts 2 to 10 by default.

***Changes in 5.00.009(N) relative to 5.00.008(N)***

1. Correction of the symbol timing error impairment for BLE packet generation.
2. Correction for MT8852B-017 operation.
3. Improvement to MT8852B status messages when in Signal Generator mode.
4. Improvement to the GPIB control stability.

**MT8852B software release note****Changes in 5.00.008(N) relative to 5.00.004(N)**

1. Support for 2-Wire interface DUT control for Bluetooth 5 Measurement options.
2. Addition of BLE 1Mbps DUT control format selection implemented according to the Bluetooth 5 specification as a user configurable setting. The default BLE 1 Mbps control format is to the Bluetooth 4.0 specification for backwards compatibility.
3. Changed BLE limits sign expressions to comply with the Bluetooth Core specification v5.0.
4. Improvement to 2LE power measurement accuracy.
5. Correction to MT8852B transmitter level accuracy below -75 dBm. Applicable to MT8852B testers with firmware versions: 5.00.001, 5.00.002, 5.00.004 (not including 5.00.00xN).

**Changes in 5.00.004(N) relative to 5.00.002(N)**

1. Further improvements in the operation stability.

**Changes in 5.00.002(N) relative to 5.00.001(N)**

1. Improvement in the operation stability.

**Changes in 5.00.001(N) relative to 4.20.007**

1. Required for Bluetooth 5 options MT8852B-070 (Platform Enhancement), MT8852B-035 (Bluetooth Low Energy 2 Mbps – 2LE), and MT8852B-036 (Bluetooth Low Energy Long Range – BLR)
2. Addition of EUT control via USB Adaptor to 2-Wire (in addition to USB Adaptor RS232).
3. Change number of packets for Script 1 BLE Output Power from 100 to 10 packets.

Note: Firmware 4.20.007 and earlier versions can only be installed in MT8852B testers where the following conditions are met:

- The first three serial number characters are neither "6A6" nor "626".
- Neither MT8852B-170 nor MT8852B-270 option is installed.
- The RF PCB fitted in the instrument is revision 7 or less.

**Changes in 4.20.007 relative to 4.20.000**

1. Change to the BLE carrier frequency limit and measurement as defined in TCRL2015-2.
2. Support for the BLE Packet Error Rate (PER) limit selection based on the packet data length as defined in TCRL2015-2.
3. Correction to path loss selection for BLE packet generation operation.
4. Correction to 2-Wire interface control for DLE (4.2) devices.
5. Correction to allow Test Packet Length selection on fixed scripts 1 and 2.
6. Several GPIB command corrections.

**MT8852B software release note****Changes in 4.20.000 relative to 4.18.000**

1. Required for option MT8852B-34, Bluetooth low energy Data Length Extension (DLE) measurements.
2. Improvement to the robustness of EUT FTDI USB-Serial operation.
3. Extension to the allowed range of the EDR receiver test threshold limits. The default limits have not changed. They are as defined in the Bluetooth Standard RF test requirements
4. Correction to the lock protection of scripts.
5. Correction to ESR register status reporting when looping test scripts.
6. Correction of EDR Relative Power results display on extended results pages.

**Changes in 4.18.000 relative to 4.16.002**

1. Addition of a new EUT Address source selection for EUT control with FTDI USB Serial Adaptors. This allows the MT8852B to directly interface to EUTs with a FTDI USB-Serial interface.
2. Increased tolerance to non-Bluetooth class devices on the EUT control interface.
3. Addition of the ability to send HCI Reset using the EUT control interface to connected devices.
4. Correction to the inquiry response time to reduce inquiry duration.
5. Correction to internal channel selection for BLE Hopping ON Defined.
6. Correction to input range selection for BLE devices with large power ramp profiles.
7. Correction to the Signal Generator output to extend the Modulation Index to 0.5.
8. Several GPIB command corrections.

**Changes in 4.16.002 relative to 4.16.001**

1. Addition of new GPIB commands to allow Vendor Specific HCI commands to be sent over the tester EUT Control port.
2. The RS232 handshaking for the RS232 EUT Control can now be user selected between the default CTS/RTS and None.
3. Improvements to the robustness of EUT USB operation.
4. Correction of channel power measurement when using the BLE TX test support without HCI or 2-Wire Control.
5. Correction of BLE packet generator operation to ensure continuous transmission of packets under all instrument configurations.

**Changes in 4.16.001 relative to 4.16.000**

1. Addition of new GPIB commands for BLE TX test support without HCI or 2-Wire Control.
2. Correction of EPC Summary screen display to hold and display the worst measured value.
3. Disabling of the GPIB inquiry command when a Bluetooth connection is already established.
4. Several GPIB command corrections.

**MT8852B software release note****Changes in 4.16.000 relative to 4.14.000**

1. 2nd Official Bluetooth low energy (BLE) release, now fully compliant with adopted Bluetooth SIG core specification 4.0, including:
  - BLE Packet Rate Integrity test case supported.
  - The HCI Op-Codes changed to Bluetooth SIG 4.0 Specification.
  - BLE 2-Wire Interface supported.
  - Dirty transmitter is now available on the BLE receiver sensitivity test case.
  - Dirty Transmitter and Alternating CRC is now available on the BLE Packet Generator.
  - Receiver sensitivity search added to BLE Measurement PC software.
  - A Low energy only tester implementation is now available - MT8852B-043.
2. Enhanced Power Control (EPC) is included as standard in all instruments.
3. EPC test case updated to align with requirements of the adopted version of the EPC test case
4. The supported features screens include EPC and the BLE feature bits.
5. Ability to run scripts of BR/EDR and BLE tests in a loop.
6. Correction of Single Payload mode operation that could result in no results displayed when selected.
7. Improved error handling when errors reported following testing of BLE devices
8. Improvements for internal RF trigger for BLE testing.
9. An improved tolerance of the Power Control and Enhanced Power Control test cases with specific sequence of GPIB commands.
10. The Dirty transmitter is now enabled by default for all scripts and all tests where relevant.
11. Correction to error reporting, occasionally the message "Invalid packet type" was incorrectly shown on the tester screen even if no error had occurred.
12. Correction to the channel selection for Hopping On defined test condition.
13. The INS register does not include the BLE packet generator status when BLE is not enabled.
14. Correction of limit checking for BLE Output Power test.
15. Several BLE GPIB commands corrections.

**Changes in 4.14.000 relative to 4.10.003**

1. Required for option MT8852B-23 Enhanced Power Control (EPC) measurements
2. Required for option MT8852B-27 Bluetooth low energy measurements
3. The Equipment Under Test fail register (ETF) and EDR fail register (EETF) have been modified to report all tests that have failed in a completed script. In previous revisions of the instrument software, only the first test that failed was reported.

**MT8852B software release note****Changes in 4.10.003 relative to 4.10.001**

1. The Carrier and Modulation Accuracy test case now displays "Fail" if any of the Low, Medium or High frequency stages fail individually.

**Changes in 4.10.001 relative to 4.10.000**

1. Correction to the instrument power on initialisation process to ensure that the instrument is in a known state following any previous activity.
2. The modulation index "Pass/Fail" test status now reflects "Fail" if any of the Low, Medium and High test frequencies fail instead of the average of all three.
3. The HCI commands that are sent over the EUT Control Interface that have been deleted in the recent updates to the Bluetooth specification have been removed
4. An improved tolerance of Bluetooth 2.1 devices if they are connected to the EUT Control Interface.
5. Correction of the formatting for a GPIB result string for the EDR Carrier and Modulation test if extended results were requested.
6. Correction of an error condition that may have caused the tester to fail to change the Transmitter power level to 0.0dBm immediately after a Power On or Preset of the tester.
7. Improved robustness of EDR Relative Power test minimum power level check, to better manage testing of EUTs with very low minimum output powers.

**Changes in 4.10.000 relative to 4.08.004**

1. The MT8852B can support the option 14, Headset and Hands-free profile emulator.
2. The detailed information for any Frame Error Rate (FER) can now be read over GPIB as extended results values for the EDR Sensitivity, EDR BER floor, EDR Differential Phase Encoding and EDR Maximum Input test cases. GPIB reporting of; number of errored frames and the reason for frame error, defined as: CRC, length, lost.
3. The Guard time value for all EDR packets can now be read over GPIB.
4. The addition of a minimum power limit for EDR Relative Power test case to prevent link failures.
5. Optimisation of the measurement speed for the standard rate transmitter test cases, when configured with Hopping On with defined test frequencies.
6. An improved tolerance of non Bluetooth USB devices if they are connected erroneously to the EUT Control Port.
7. Correction to prevent an occasional time delay that could occur between test stages.
8. Correction to prevent the tester the front panel keys still being active in Signal Generator & CW Measurement Modes when under GPIB Control.
9. Correction of an instance when the BlueSuite Pro3 failed packet notification was not correctly reported. This could cause the BlueSuite Pro3 failed packet display feature to fail.
10. Correction of an instance of a specific internal error code that did not generate a DDE error if it occurred.
11. Correction of system bug if 'Defaults' was selected when EXT-HCI was active.
12. Correction of GPIB command PATHDEL to allow offset table deletion.
13. The Connection Packet Control packet default is now for only standard rate packets to be selected. This is to work-around a limitation in some early EDR DUT's.

**MT8852B software release note*****Changes in 4.08.004 relative to 4.08.000***

1. The setting of the EDR dirty transmitter has been improved to ensure that the  $\pm 10\text{kHz}$  sine wave modulation term shall not exceed the correct deviation. In earlier software releases, it was possible that the sine wave modulation could set up to  $\pm 15\text{kHz}$  deviation.
2. Correction to the management of offsets that resulted when the RF output power was required to exceed 0dBm. 0dBm is the maximum output power from MT8852B, should an offset require the instrument power to exceed 0dBm, an appropriate error message is displayed.
3. Correction of an error condition when AFH was enabled and active. This resulted in a small residual FER in the AFH FER results trace when the MT8852B pseudo local assessment map was enabled and 1 to 14 channels in this map were masked.
4. Correction of an error condition when AFH was enabled and active that resulted in a minimum measured FER of 0.13% in the AFH FER results trace.
5. The absolute power of the FSK and PSK part of a packet can now be read over GPIB as extended results values from the EDR Relative Transmit Power test case. See attached addendum for new commands. The specification for absolute power measurements of FSK and PSK modulated signals made in the EDR Relative Transmit Power test case is  $\pm 1.5\text{dB}$ .
6. Correction of an error condition that resulted in the "Connection packet control" table not being set correctly following a power reset or front panel Preset.
7. Correction to the status of the standard rate (GFSK) dirty transmitter drift. In previous MT8852B software releases, it was possible that the GFSK dirty transmitter drift parameter could remain enabled after it had been turned off in the dirty transmitter edit table.

***Changes in 4.08.000 relative to 4.06.000***

1. Correction of MT8852B transmitter output power level. Earlier software revisions could result in the transmitter power level being set up to 3dB below the indicated value. This could occur in test mode connections, when the frequency of the previous received packet has a large frequency offset relative to the transmitted packet.
2. Correction to possible error condition when exiting from either CW measurement mode or Signal Generator mode, and entering standard Bluetooth frequency hopping modes. Software revisions 4.04.000 to 4.06.000 could fail to connect to EUTs after exiting CW measurement or Signal Generator modes. This was a result of the instrument not correctly initialising for standard connections on exiting the previous modes.

***Changes in 4.06.000 relative to 4.04.001***

1. Use of the \*RST GPIB command corrected. The OPC (operation complete) bit in the ESR register is never set before the MT8852B has fully reset following a \*RST GPIB command. In software build 4.04.001 following a GPIB \*RST command, the OPC bit could be set before the instrument had fully reset.
2. The EDR Dirty Transmitter sinusoidal drift is always disabled following completion of any test that invokes the EDR dirty transmitter. In earlier software builds, the drift parameter of the EDR dirty transmitter could occasionally remain active in a test following an EDR sensitivity test.
3. Correction to errors in the GFSK Carrier Drift measurement result. Earlier software versions could give a false high reading for the carrier drift measurement. The magnitude of the error was dependant on a number of variables including the channel number under test and the EUT Bluetooth address. Carrier drift values of up to 30kHz could have been measured on Bluetooth EUTs with actual drift rates of  $< 10\text{kHz}$ .



**MT8852B software release note*****Changes in 4.04.001 relative to 4.04.000***

1. Signal Generator mode power level corrected for channels below Bluetooth channel 0. In earlier software builds, the power level of the signal generator when used at Bluetooth channels -1 to -10 could be in error above the  $\pm 1$  dB specification. This error only applied to fixed frequency signal generator mode and did not apply to power levels in a test connection.

***Changes in 4.04.000 relative to version 4.00.000***

1. Addition of support for the EUT RS 232 control interface.
2. Addition of support of single payload mode, continuous loopback with EDR packets. This feature required for the "EDR In-band Spurious Emissions" test case. This test case also requires the addition of a spectrum analyzer such as the MS2681A.
3. Addition of Null packet measurement mode.
4. The time taken for the MT8852B to return to normal operation from both "CW measurements" mode and "Signal Generator" mode reduced to approximately 1 second.
5. A rounding error corrected that could result in measurements exactly on a specification limit being incorrectly judged as a measurement failure.
6. The default, hopping off, test frequency tables for the EDR receiver BER test cases corrected to match the conditions of the Bluetooth 2.0 core specification.
7. The guard time interval between GFSK and PSK parts of the EDR packet of the MT8852B transmitter corrected. The 4.00.000 software version could set the guard time to 4.6 $\mu$ s instead of 5 $\mu$ s.
8. A new GPIB command (SCPTTSTGP) added to facilitate the control of the measurements run in a script. Simplified remote operation selection between; Standard rate only, EDR only, or both standard and EDR measurements.

***Known Limitation in 5.00.021(N)***

1. The 921600 baud rate is disabled in the EUT Control.